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A CASE OF IRITIS WITH SOME INTERESTING INCIDENTS.

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THE points of interest in the clinical observations I am to report are: 1. That atropine asserted its mydriatic power over the pupil to its full extent, while at the same time, on account of incompatibility, it seriously aggravated the iritis. 2. That duboisine induced glaucomatous symptoms during an attack of iritis under the same conditions under which in the same eye it had repeatedly overcome the inflammation before.

In March, 1881, L. H., aged 40 years, a robust butcher of Napersville, presented himself at my office with an acute iritis of the left eye. The inflammation began 6 or 7 days previously with severe peri-orbital neuralgia, which still persisted at the time of this first visit. The eye showed the symptoms of a very violent iritis; intense vascularity of the ocular conjunctiva and peri-corneal zone; interstitial haziness of the cornea; discolored and swollen iris, and contracted pupil, with numerous posterior synechiæ. Within three days, however, all these synechiæ yielded to the action of atropine, and the pupil became dilated uniformly, though not ad maximum. But for all this the inflammation had not only not diminished, but appeared rather increased; there was considerable chemosis of the conjunctiva, greater haziness of the cornea, and a small hypopyon. The patient also informed us that each instillation of atropine caused a smarting sensation, which lasted about 20 minutes. Atropine was evidently not compatible with that eye; duboisine was, therefore, substituted, and at once the inflammation began to

subside, and the eye made a quick and complete recovery with $V = \frac{20}{10}$.

In March, 1883, this gentleman had a similar attack of iritis in his left eye. Duboisine was used from the beginning; no chemosis, no hypopyon appeared, and the eye was well in 10 days.

During both attacks of iritis the patient had not been stopping in the city, but came in from his town (30 miles) every two or three days. Duboisine locally and calomel (gr. $\frac{1}{4}$ pro dosi) internally constituted all the medical treatment he received. And it seemed to be all that was necessary to lead the case to a successful termination.

On the 21st of August the patient came to me again with iritis of the left eye. The objective changes in the iris and pupil were exceedingly slight, the inflammation having set in but yesterday; but there was much chemosis of the ocular conjunctiva and very severe peri-orbital neuralgia. Leeches were applied to the temple; a brisk cathartic ordered, and duboisine prescribed; but I could not prevail upon the patient to remain in the city. On the 29th he came back, and in spite of complete mydriasis the inflammation was so violent that the patient at last concluded to remain in town. He was kept in a dark room, leeches were applied again, followed by warm fomentations with chamomile tea. Duboisine was instilled four times in 24 hours, and calomel ($\frac{1}{4}$ gr.) given three times per day. Under this treatment the inflammation subsided so quickly that on September 1, I allowed the patient to return home. He walked the short distance from my office to the railroad depot, where he arrived bathed in profuse perspiration, and in this condition he was exposed to draft all the way home. The result was a violent relapse of the iritis (Sept. 5). He was put at once under the same regime (dark room, cathartic) and treatment (leeches, warm fomentations, duboisine), and it seemed at first as if the inflammation would once more subside as readily as before. But the improvement lasted only 24 hours; and the following day (Sept. 7) the eye was worse than ever; chemosis increased, the cornea very dull and cloudy, the iris swollen, and the pupil muddy and not as well dilated as on previous day. The pain was very severe, extending over the

whole left side of the head, and the intra-ocular tension, which on frequent previous tests had always been found normal, was now markedly increased and reduced to perception of light.

Under these circumstances I regarded as futile any further effort to control the inflammation by medical treatment alone; surgical interference seemed unavoidable, iridoctomy plainly indicated. I gave my opinion to that effect, and arranged with the patient to perform the operation in the afternoon (I had seen him early in the forenoon). In the meantime he was to continue with the warm fomentations, but to apply no more duboisine, as I would rather have the pupil more contracted by the time of the operation. When I called at the appointed hour to perform the operation I found my patient had changed his mind. As cheerfully as he had consented in the morning, so strongly he was now opposed to it, claiming that the headache was much less and his eye felt much better. I was inclined to suspect he only pretended feeling better, just as patients with the toothache often do when they get near the dentist. But the eye was certainly no worse, and I was not quite sure but what its tension was a shade less than in the morning, and the cornea appeared a little brighter. If this was really the faint beginning of an improved condition, was it due to the omission of the duboisine? In other words, had the duboisine caused the glaucomatous condition? And would the eye recover from it without operation, if no duboisine was used any more? The improvement of the eye following so closely upon the discontinuance of the remedy was a remarkable coincidence which attracted my full attention, and I therefore readily agreed with the patient to defer the operation until the next day. But I was very particular that in the treatment of the eye and in the patient's mode of living, nothing was changed except that the duboisine was left off.

The next morning I found the patient free from neuralgia, the chemosis diminished, and the intra-ocular pressure undoubtedly reduced, though still positive. But on the 11th it was normal, cornea clear, chemosis gone, and on the 15th of September no vestige of the inflammation was left; V was $\frac{20}{20}$, and the pupil of normal size and mobility.

A CASE OF TUMOR OF THE ORBIT. EXENTERATIO ORBITÆ. RECOVERY.

BY HENRY FERRER, M. D., SAN FRANCISCO.

MRS. OTERO, from Hermosillo, Mexico, consulted me on May 25, on account of her left eye. Patient did not know her exact age, but pretented to be about 64 years old. She was poorly nourished, but said she had always enjoyed good health. All I could ascertain from her about her disease was that, about eighteen months ago, she suffered very much with sharp shooting pains in the left eye and the left side of her head. During this period of pain her left eye became very much inflamed, and there was considerable lachrymation. The physicians, she then consulted applied several remedies to the lids which, however, gave her no relief. Gradually she began to see double, and she noticed at the same time that the eye-ball gradually turned inwards. She, therefore, covered it with a handkerchief under which, as she states, the eye became totally displaced. For about six months previous to consulting me, she was compelled to cover the eye during the night also, because the lids could not be closed over it even during sleep. When consulting me, she had two handkerchiefs tied around her head, one as a *monoculus* to cover the left eye, and one as a *mentoniere* (chin-bandage) to conceal a deep cicatrix extending from the left ear to the upper lip, the result of a love-token received in her younger days from her intended (which, by the way, is a very common practice in certain provinces of Mexico).

Status præsens. The left side of the face presents a peculiar appearance. There is complete ptosis with bulging and œdema of the upper lid and considerable exophthalmus, the eye-ball being pushed inwards and downwards. The lower lid is apparently in its normal position, but its lower portion is œdematus, and this œdema increases downwards, until it forms a swelling of the size of a pigeon's egg in the zygomatic region. This œdematous infiltration is so sharply defined, that it has all the appearance of a neoplasm, and this condition is due to the callous cicatrix above mentioned, which prevents the œdema from extending

diffusely downwards. The palpebral, as well as the ocular conjunctiva, is slightly hyperæmic. Lachrymation and secretion of the mucous membranes are normal. The iris is very dark, almost black; the pupil is small, but of the same size as the right pupil, and it reacts promptly upon light. The movements of the eye-ball are totally restricted outwards, partially upwards, and but slightly downwards. When she closes her eyes gently, the left eye remains slightly uncovered, but with a great effort and an increased action of the lower lid, it can be totally covered. Vision is normal. Emmetropia. The fundus shows no difference in appearance from that of the right eye ; both are normal.

Upon palpation the exophthalmus is found to be caused by a hard growth situated at the region of the lachrymal gland. The tumor is quite hard and apparently well defined, but it cannot be moved sideways, nor be pressed back into tho orbit. From the middle of the upper lid it extends outwards and downwards to the lower outer orbital margin. R E emmetropic. V. normal.

On the 27th, I proceeded to remove the tumor with the assistance of Drs. M. Richter, P. de Vecchi and Olino. The patient being put under the influence of ether, I began the operation. I intended to carry it out in the same manner as *O. Becker* had operated in his case of bilateral lymphadenoma of the orbit (*Græfe's* Archiv XVIII, 2. page 56), and at the operation of which I had been present. I first made an incision along the upper orbital margin from the middle of the upper lid downwards in a curve to the outer angle of the palpebral fissure. Then I divided the tarso-orbital fascia and with the handle of the scalpel and a periosteum-elevator tried to enucleate the tumor. But the growth was so large that, in order to be able to reach the deeper parts of the orbit, I had to take it out in pieces. In doing this I found that the external and the superior recti muscles of the eye-ball were already involved in the process. We, therefore, decided to abandon the first plan of operating with preservation of the eye-ball, to sacrifice the latter, and to perform exenteratio orbitæ.

After the eye-ball had been enucleated, and the ensuing hemorrhage had been stopped, I proceeded in the following manner:

I began by removing from the lids as much as possible of the conjunctiva, and by means of a pair of curved scissors and the periostium-elevator, I detached all the contents of the orbit from the walls of this cavity, as close to the bone as possible, even tearing portions of the periosteum in some places, where the attachments were too firm. At last, when all was loosened from the walls and attached only to the fundus of the orbit, this pedicle was cut with a strong pair of curved scissors. A very free hemorrhage ensued, but yielded easily to the application of *Paquelin's* cautery.

During the whole operation strict antisepsis was carried out. A 1 per mille solution of corrosive sublimate was used for the sponges, and a 2½ per cent solution of carbolic acid for the instruments.

After the operation the cavity of the orbit was filled with a sponge, covered with carbolic gauze and salicyated cotton, and over these a compressive bandage was applied. No secondary hemorrhage took place. On the second day the sponge was removed from the orbit, and this cavity appeared to bo free from all particles of the growth.

The patient was seen twice daily. Her temperature was never above the normal. The wound was dreessed every twenty-four hours, and the cavity was filled with small pieces of carbolic gauze. For the first two weeks a solution of corrosive sublimate was used in dressing, and during this time granulations had formed in some portions of the orbital walls, but they were very pale and showed no tendency to bleed. To stimulate them, they were scraped with a small blunt scoop, and a 2½ per cent solution of carbolic acid was substituted for the corrosive sublimate. In spite of this, the conditions did not improve. We then ordered pills containing gr $\frac{1}{9}$ of corrosive sublimate, one to be taken 3 times a day. Although no syphilis could be traced the pills appeared to produce the desired effect, for within a few days the granulations became more vivid, and the patient began gradually to gain flesh. On the 13th of October, when she was discharged, the lids were drawn into the orbit, but hardly any more so than in ordinary cases of enucleation. As I have been informed by her physician there is no sign of a relapse.

I cannot give the exact measure of the tumor because it was removed in pieces.

The anterior portion which before the operation had been felt as a well defined tumor, was about 4 centimetres broad and 2 centimetres thick ; further down in the cavity of the orbit the tumor had a more irregular form and involved some of the ocular muscles and the orbital fat.

The tumor and the eye-ball were placed into Mueller's fluid immediately after their removal. For about three weeks the fluid was renewed on every second or third day, then the specimen was washed and hardened in ordinary alcohol.

The eye-ball was first examined, and special attention was paid to the optic nerve. There was nothing abnormal. Then four pieces from different portions of the tumor were taken for microscopical sections. These sections I made with a Thomas' sliding microtome, and stained them with ammoniacal carmine or log-wood, and then examined them in glycerine. A large number of such sections were made of each of the different pieces, and they all presented the same characteristic features, namely : irregular herds of spherical cells, which were pressed together without any well-marked intercellular substance and surrounded by bands of connective tissue. It was easy to make very thin sections of some parts of the tumor, and these, when stained, took on a bright color. They consisted mainly of connective tissue and contained only a few small irregular heads of spherical cells. In other parts, the sections had to be made thicker, and these, when stained with carmine, never took on a bright color, when stained with log-wood, their color was a dark violet. The herds of spherical cells in these sections were very large, and they were divided by but few and narrow bands of connective tissue. They would tear very easily, if not carefully manipulated. Even slight pressure on the cover-glass would separate the cells from each other and would make them float about in the fluid, leaving no intercellular reticulum behind. When separated, the cellular elements appeared round and granular, and measured on an average 0.006 millimetres. No better drawing of some of my sections could be given than the Figure 2 of *J. Arnold* in *Becker's* case, above referred to, with the exception that I could not find any follicles.

From the foregoing I think I am justified in considering this neoplasm to be a lymphoma of the orbit, until I am corrected by better authority. Of this I shall report in a later number of this journal.

ON THE MICROSCOPICAL CHANGES FOUND IN A TATOOED CORNEA.

BY ADOLF ALT, M. D.

THE microscopical changes found in a tatooed human cornea have thus far been twice described in literature : once by *Brovicz* (Græfe's Archiv, XXIII., 3), and the second time by *Hirschberg* (Græfe's Archiv XXVIII., 1).

The case described in the following shows a number of peculiarities which, I think, make it worth being placed on record.

Mrs. M. H., æt. 25, came to consult me on the 21st of November, 1879. She had lost the right eye nine years previous to this consultation in consequence of purulent conjunctivitis. A large leucoma which, according to her statement, nearly covered the whole of the cornea had been tatooed about three years after the eye had become blind by Dr. Kitchener of Lockport, N. Y.

For about a year the eye had been troublesome, giving her great pain at times, and she thought it was slowly growing larger. These symptoms had become aggravated during the last few weeks by an acute inflammation, and the patient being afraid of sympathetic trouble, came to me to have the blind eye removed.

Stat. praes. R. E. Considerable hyperæmia of the conjunctival and the ciliary blood-vessels. The cornea somewhat staphylomatous and grayish-blue. In its center a yellow spot is visible, which appears as if a calcareous lens was about to break through the cornea. The eye is very painful spontaneously, and the pain is aggravated by pressure on the ciliary region. + T 2 ; V = o. — L. E. V = $\frac{20}{20}$. Perfectly normal.

Two days after this examination I enucleated the eye-ball. Operation and healing were normal.

When the eye-ball was perfectly hardened, I found that the lens was really calcareous and had nearly perforated the center of the cornea. The cornea was on the whole thicker than in the normal condition, and was lined with atrophied iris-tissue, except in the part where the lens lay. Here it was reduced to a very thin membrane. The optic papilla showed a deep excavation.

The microscopical conditions of the cornea were the following:

The epithelial layer of the cornea was, on the whole, somewhat thicker than normal. *Bowman's* layer was wanting nearly throughout. From the epithelial layer a large number of cell-cylinders, not simple papillæ, had grown into the corneal tissue, (See figure 1), some of which nearly reached through its whole thickness down to *Descemet's* membrane. These cylinders varied not only in length, but also in thickness. The majority of them were simply solid cylinders of epithelial cells. A number of them, however, were partially hollow, and thus formed cavities of varying size in the cornea, which were lined with a more flattened epithelium, and contained a serous fluid in which a small number of lymphoid cells were suspended. (See figure 2).

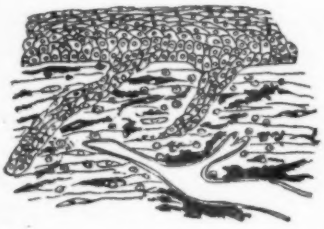


FIG. 1.

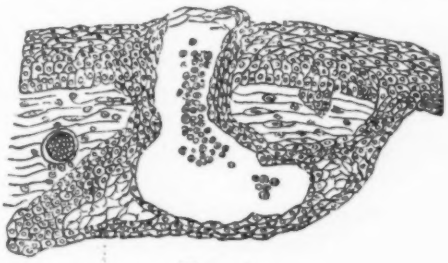


FIG. 2.

An irregular arrangement of the corneal epithelium is never wanting where *Bowman's* layer has been destroyed. Solid epithelial cell-cylinders, however, growing into the corneal tissue in the manner of these just described, I have thus far never found, except in cases of malignant epithelioma. The case under consideration showed no other characteristics of a malignant epithelioma, and, moreover, the hollow cylinders are some-

thing not observed in malignant epithelioma. There can, I think, be no doubt but that these cell-cylinders have been formed in and mark the pricks of the tatooing needle. In *Hirschberg's* case no such epithelial formations are mentioned at all, and *Brovicz* describes irregular bundles of fibrous tissue in the corneal tissue as traces of the pricks of the tatooing needle.

I thought it quite strange that I could not find any pigment lodged in these epithelial cells, nor in the epithelium of the surface of the cornea. The pigment molecules of the ink were scattered all about in the corneal tissue proper, where, by their bluish-black color they could be easily distinguished from the uveal pigment which was also embedded in the cornea. These pigment molecules of the tatooing ink were either embedded in the corneal parenchyma cells, or they lay free in the corneal tissue. The center of the cornea was nearly free from them, while they appeared most numerous in its periphery, where it also seemed as if some of the pigment was enclosed in blood-vessels.

The changes in the remainder of the tissues of the eye-ball were of no importance.

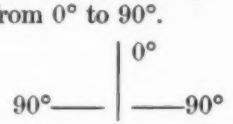
ON THE VALUE OF THE "PRISOPTOMETER" IN DETERMINING THE DEGREE OF MYOPIA.

BY H. CULBERTSON, M. D., ASSISTANT SURGEON U. S. ARMY. RETIRED.

THE "Prisoptometer" is an instrument invented by the writer to determine ametropia by the means of a prism. Essentially it is composed of a single prism of glass, of about 3° total refraction, the apex of which covers, and is secured over, the half of a central opening of 3. mm diameter, in a diaphragm of metal, which latter can be revolved at pleasure. The patient seated, looks through the central aperture at a *single* white circle, on a dark ground, placed at a distance from the observer, of from fifteen to twenty feet. This circle has a diameter according to the refraction of the prism, or proximity of the eye to the circle, of about 150 to 200 m.m. From the influence of the prism

two images are seen. The prism being *fixed* at such a distance that the inner margins of the two images, the true and false circles, are tangent in the *emmetropic* eye. It follows that, in myopia the circles will appear to lap, and in hyperopia they will seem to be apart. It is only necessary to apply the proper lenses in front of the prism until the circles are tangent, and *these* will denote the glasses required to correct the ametropia. Astigmatism is detected in the same manner by revolving the *prism-disk*, so that thus the refraction of the eye can be determined quickly and accurately.

It should be stated that the scale of the instrument embraces a semi-circle, the verticle of which is 0°, and each quadrant, on the right and left, is divided into spaces of 10° each, running thus on either side from 0° to 90°.



This instrument has been accurately described in the "Cincinnati Lancet and Clinic," January 20, 1883, and as improved in the "Journal of the American Medical Association," January 5, 1884.

An article on the value of this instrument in determining the *total* and *manifest* hyperopia has appeared in the "New York Medical Journal," of March 22, 1884, p. 319.

The object of *this* paper is to decide what is the worth of this instrument in detecting myopia when the eye is, and is not, under the influence of mydriatics.

The maximum sum of dioptrics of myopia shown in all the cases of the table, is greatest in those not subjected to mydriatics. Thus:

The sum of M, without mydriatics = D. 202.75.
" " " with " = D. 180.25.
" " " the difference, = D. 22.50=88.90 per cent.

This is a diversity in favor of the use of mydriatics to determine the absolute myopia present with the aid of the instrument, = 100.00 per cent.—80.90 per cent. = 11.10 per cent.

In the oldest member of the table the patient's age was 57 years, and the myopia equaled D 3.0 without, and D 1.5 with my-

driatics, a reduction of 50 per cent., and in favor of the employment of such agents to determine the actual degree of myopia at this age.

The youngest patient shown in the table is 12 years of age, and in this case the myopia shown, with and without mydriatics, was equal in degree.

For all the cases of the table, the mean age is 25. years; and based upon half the sum of the dioptrics of myopia shown when not under mydriatics ($\frac{202.5}{2}$), and the sum of dioptrics of the same form of ametropia in those subjected to these agents ($\frac{180.25}{2}$), the age at 25 years reveals only 11.10 per cent. in favor of the use of mydriatics to determine the absolute myopia present at that age.

If the cases be classified in age-periods of five years, and the dioptrics estimated, as shown in the table, in each class, both when the patients are, and are not under mydriatics, the following is the result:

Age—Years.	Without mydriatics.	With mydriatics.	Per cent.
12—15	D 43.00	D 41.50	96.51
16—29	D 61.00	D 59.50	96.72
21—25	D 39.25	D 33.00	84,07
26—30	D 49.75	D 40.00	80.40
31—35	D 2.25	D .25	11.11
40—45	D 4.50	D 4.50	100.00
Over 45	D 3.00	D 1.50	50.00
Total 45	D 202.75	D 180.25	

Thus it is shown from 12 to 20 years, and from 40 to 45 years, the manifest closely approximates the absolute myopia, or is equal to it in the latter class.

The low degree of absolute myopia shown between 31—35 years = 11.11 per cent., is due, no doubt, to the limited number of cases (three), and cannot be relied upon as an accurate index of the myopia revealed by the instrument for this "age-period."

In the period "over 45 years" there are but two cases, and these, each aged 57 years. By reference to the formulæ in these examples, it will be seen that under the mydriatic the + D1 c of hyperopic astigmatism disappeared in the right eye, and so

also the + D 0.5c, H.A. in the left eye, leaving—D 0.75s in each eye, as the real degree of myopia. It would be more accurate to regard the astigmatism in these cases, as not hyperopic, but as simply denoting the presence of spherical myopia with less of this in a given meridian. Thus—D 1.75s— +D 1.0c = — D 0.75s in the R. E; and—D 1.25s — + D 0.5c = — D 0.75s in the left eye.

The same view in principle can be taken in cases 5, 8, 10, 11, 21, 22 and 23, it being remembered that accommodation—ciltasis—sometimes is, and again is not relaxed while being tested, and mydriatics not employed.

The "age-period," 21—25 years, reveals, through the instrument, 84.07 per cent., and that of 26—30 years 80.40 per cent. of absolute myopia, after the use of mydriatics. As 100 per cent. is the apparent myopia, without the influence of these paralyzing agents, the latter means develop at these age-periods respectively, 15.93 and 19.60 per cent. of this form of ametropia. During the "age-period," 12—15 years, 96.51 per cent. of myopia is found, or 100—96.51 = 3.49 per cent. of effect due to mydriatics. From 21—25 years the power of mydriatics = 15.93 per cent., or 15.93—3.49 = 12.44 per cent. ; and from 26—30 years *it* = 19.60 per cent., or 19.60—3.49 = 16.11 per cent. increased influence in these age-periods over the effect of such agents (mydriatics), found in those aged 12—15 years. To what is this effect due? Is it produced by the hyperopia present in these cases, shown when mydriatics have not been used? To determine the cause of this, estimate the sum of dioptrics of hyperopia in the several cases up to 30 years, and deduct from the sum of dioptrics of myopia found up to that age in the column "maximum myopia" of the table, which will reduce the influence of age, as a factor, in causing the augmentation shown of the myopic from the use of mydriatics.

This apparent hyperopia is evident in the following table:

No. of cases.	D H without mydriatics.
5	+ D 1.50
8	+ D 0.75
9	+ D 0.75
17	+ D 0.50
18	+ D 1.25

No. of cases.		D H without mydriatics:
22	- - - -	+ D 1.00
24	- - - -	+ D 0.50
25	- - - -	+ D 0.50
26	- - - -	+ D 0.50
31	- - - -	+ D 1.75
32	- - - -	+ D 1.50
35	- - - -	+ D 1.25
36	- - - -	+ D 1.25
Total 13	- - - -	+ D 13.00

Compare this with the following table;

Total apparent myopia without mydriatics up to 30 yrs. D 193.00.
" " hyperopia " " " " D 13.00.

Sum of absolute myopia " " " " D 180.00.

Compare this last quantity with the sum of absolute myopia found after the use of mydriatics up to 30 years, and the following results:

D 180.00 — D 174.00 = D 6.00 of myopia, to be accounted for as an effect of age or other cause. If the D 6.00 of M. be divided by the number of cases, up to this age, 38, or $\frac{\text{D } 6.00}{38} = \text{D } 0.157$, this calculation reveals an average difference, per case, between the apparent and absolute myopia of but .157 of a dioptric. Hence it may be assumed that removing the influence of apparent hypermetropia, the myopia, with and without mydriatics, will be equal, as appears from the records of the instrument.

Looking at the influence of age, from 12 to 30 years (as shown in the table), in modifying the degree of myopia when this instrument is used, it is seen the well known law is corroborated that myopia diminishes as age increases.

The rule that the *weakest* concave lens which will render the images tangent is the measure of the absolute myopia, is demonstrated by the instrument in many of the cases given in the table. It is believed that in all cases of simple myopia in which the subject is capable of relaxing the ciliary muscle, that such a glass will determine through the instrument the static myopia.

With the instrument, as with concave lenses alone, the patient has the power often of bringing the images of the circle together with a stronger as well as with a weaker negative glass. Thus

in cases 13 and 14 the patient can, when not under mydriatics, cause the images to touch with—D 16 when using the full power of the ciliary muscle; but when that muscle is relaxed—D 12 is *only* required to render the images taugent.

The instrument, therefore, is applicable for measuring the accommodation in many cases, and the strongest,—the weakest concave lens which induces the tangency is the glass which measures this.

What influence does a diseased state of the eye have in developing the degree of myopia present when the organ is under, or not under the effects of mydriatics? This question is shown as follows:

		Without mydriatics.	With midriatics.	Per cent.
Eyes diseased	12 cases.	D 95.00	D 91.25	96.05
" healthy,	33 "	D 107.75	D 89.00	82.59
Total	45	D 202.75	D 180.25	13.46

Thus in those with *diseased* eyes the myopia with (96.05 per cent.), and without (100.00 per cent.), the agency of mydriatics is nearly equal, being only 3.95 per cent. greater in those not subjected to such agents. In those whose eyes are not diseased the difference is greater under and without mydriatics; or 100—80.59 = 17.41 per cent. in those not subjected to mydriatics.

The presence of disease of the eye in these cases, while not practically interfering with the determination of the degree of myopia, has, therefore, a tendency to render the absolute myopia more readily detected; and the absence of mydriatics to mask a portion of the myopia, in the use of the instrument, in eyes not diseased.

The influence of the several mydriatics employed may be expressed as follows:

Mydriatic.	With mydriatic.	Without mydriatic.	Per cent.
Hyoscine.	D 54.50	D 59.50	91.26
Duboisine,	D 101.75	D 115.25	88.28
Homatropine,	D 7.50	D 11.50	65.21
Atropine,	D 16.50	D 16.50	100.00
Cases 45	D 180.25	D 202.75	

It is thus apparent that the hyoscine exercised the greater influence upon the accommodation, the duboisine less, the homatropine still less, and the atropine the least, ar none at all. The latter result cannot be due to the inefficacy of the agent, but this defect is probably due to the effects of choroiditis present in this class of cases. The result in the case of the homatropine cannot be attributed to disease, so that *it* is the least potent of the mydriatics.

Practically hyoscine and duboisine are equal in their effects upon the accommodation; and as the former acts more rapidly and its effects pass off sooner, it may be preferred to the latter agent. This conclusion is based upon the cases of the table, but experience with the use of hyoscine corroborates this view.

In general a larger number of cases may change the results formed in these examples of myopia, still they point to the value of the instrument in detecting myopia.

As is well known, hyperopia may mask myopia, the degree so covered is shown as follows:

Case.	Total myopia found after use of mydriatics.
5	D 1.50
8	D 1.00
9	D 1.00
17	D 0.75
18	D 0.75
22	D 0.50
24	D 0.50
25	D 0.50
26	D 1.25
31	D 2.50
32	D 2.25
35	D 1.25
36	D 0.75
Cases 13	D 14.50 = 89.65 per cent.

Thus in the 13 cases showing hyperopia, there is 14.50 dioptrics of *absolute* myopia. In the same cases there has been found 13.00 dioptrics of hypermetropia. Compare these as 14.50: 13.00 :: 100.00: 89.65 per cent. That is all save 10.35 per cent. of the myopia of *these* 13 cases is masked by hypermetropia.

TABL

Number of Cases	Age of Patient	Name	Right or Left Eye	Mydriatic Used	Formula for Dioptrics of Myopia under Mydriatic.	Formula for Dioptrics of Myopia without Mydriatic.	Sum Maximum of Dioptrics of Myopia
1	12	M. D	R	Hyoscine	−12.s−2.c 90° r.	−12.s−2.c 90° r.	14.0
2	12	M. D	L	Hyoscine	−11.s.	−11.s.	11.0
3	14	W. O'B.	R	Atropine	−11.s.	−11.s.	11.0
4	14	W. O'B.	L	Atropine	−5.50s.	−5.50s.	5.5
5	15	C. C	L	Hyoscine	+1.5s+1.c 90° l	−1.5c 90° l+1.75c 0°...	1.5
6	16	D. S.	R	Duboisine	−3.5s−2.75c. 85° r	−3.5s−2.75c. 85° r	6.2
7	16	D. S.	L	Duboisine	−6.s−4.c 65° r.	−6.s−4.c 75° r.	10.0
8	17	S. M. C.	R	Homatropine	−.25s+2.25c 30° r.	−1.s+2.5c 30° r.	1.0
9	17	S. M. C.	L	Homatropine	−.25s+1.25c 40° r	−1.s+1.25c 40° r.	1.0
10	17	L. R. C.	R	Duboisine	−1.75s+.75c 85° l.	−1.75s+.75c 85° l	1.7
11	17	L. R. C.	L	Duboisine	−1.75s1+.75c 85° r	−1.75s+ 75c 85° r	1.7
12	18	C. C.	R	Hyoscine	−.2s−1.5c 80° r.	−2.s−1.5c 80° r.	3.5
13	20	M. M.	R	Duboisine	−12.s.	−12.s.	12.0
14	20	M. M.	L	Duboisine	−12.s.	−1.2s	12.0
15	20	A. R.	R	Duboisine	−5.s−76.c 50° r.	−5.s−.75c 50° r.	6.2
16	20	A. R.	L	Duboisine	−5.5s.	−5.5s.	5.5
17	21	M. F. S.	R	Duboisine	+.5s	−.75s.	.7
18	21	M. F. S.	L	Duboisine	+1.25s.	−.75s.	.7
19	21	L. N.	R	Hyoscine	−13.s	−13.s.	13.0
20	21	L. N.	L	Hyoscine	−11.s−2.c 75° l	−11.s−2.c 75° l	13.0
21	21	L. E. G.	R	Hyoscine	+1.25c. 80° r.	−1.s+1.5.c 80° r	1.0
22	21	L. E. G.	L	Hyoscine	+1.c. 90° l	−.5s+1.c. 90 l.	.5
23	22	W. F. B.	L	Homatropine	−7.s+2.5c 50° r.	−8.s.	8.0
24	23	M. B.	R	Duboisine	+.5s.	−.5s.	.5
25	23	M. B.	L	Duboisine	+.5s.	−.5s.	.5
26	25	S. S.	R	Duboisine	+.5s.	−1.25c 90° r	1.2
27	26	W. H. S.	R	Duboisine	−.1c 40° r.	−1.c 40° r	1.0
28	26	W. H. S.	L	Duboisine	−2.5c 60° r+1.c 20° l	−2.5c 60° r+1.c 30° l.	2.5
29	27	E. H.	R	Duboisine	−.25c 55° r.	−.5c 55° r	.5
30	27	E. H.	L	Duboisine	−.25c 0°	−.25c 0°	.2
31	28	A. B.	R	Duboisine	−.25c+1.75c 90° r.	−2.5c 90° r	2.5
32	28	A. B.	L	Duboisine	−.75c 85° l+1.5c 5° r.	−2.25c 85° l.	2.2
33	29	H. J.	R	Duboisine	−10.s−1.c 90° r.	−10.s−1.75c 90° r	11.7
34	29	H. J.	L	Duboisine	−10.s−1.c 90° l	−10.s−1.c 90° l.	11.0
35	30	M. W.	R	Hyoscine	+1.25c 20° r	−1.25c 20° r	1.2
36	30	M. W.	L	Hyoscine	+1.25s.	−.75s	.7
37	30	N. C. L.	R	Duboisine	−4.5s−2.5c 35° r.	−5.5s−3.c 35° r	8.5
38	30	N. C. L.	L	Duboisine	−4.5s−2.c 45° l.	−6.s−1.5c 45° l.	7.5
39	31	H. M	L	Duboisine	−.25c 50° r	−.75s	.7
40	35	L. R.	R	Homatropine	+.25s−25.c 90° l	−.50s	.5
41	35	L. R.	L	Homatropine	+.75s−.5.c 85° r.	−.50s−.5c 85° r	1.0
42	43	G. G. N.	R	Duboisine	−2.25c 90° r.	−2.25c 90° r.	2.2
43	43	G. G. N.	L	Duboisine	−2.25c 90° l	−2.25c 90° l.	2.2
44	57	T. G. S.	R	Duboisine	−.75s.	−1.75s+1.c 50 r	1.7
45	57	T. G. S.	L	Duboisine	−.75s.	−1.25+.5c 50° l.	1.2
45	1125=Sum of Ages+45.				Total Dioptrics		201.7

TABLE.

ORMULA FOR OPTRICS OF YOPIA UNDER YDRIATIC.	FORMULA FOR DIOPTRICS OF MYOPIA WITHOUT MYDRIATIC.	Sum Maximum of Dioptrics of Myopia	Sum Minimum of Dioptrics of Myopia	Per Cent. of Manifest Myopia.....	
2.c 90° r.....	—12.s—2.c 90° r.....	14.00.....	14.00.....	100.00.....	
.....	—11.s.....	11.00.....	11.00.....	100.00.....	
.....	—11.s.....	11.00.....	11.00.....	100.00.....	
.....	—5.50s.....	5.50.....	5.50.....	100.00.....	
.c 90° l	—1.5c 90° l+1.75c 0°...	1.50.....	0.00.....	100.00.....	
2.75c 85° r	—3.5s—2.75c. 85° r	6.25.....	6.25.....	100.00.....	
.c 65° r.....	—6.s—4.c 75° r.....	10.00.....	10.00.....	100.00.....	
2.25c 30° r.....	—1.s+2.5c 30° r.....	1.00.....	.25.....	0.75.....	
1.25c 40° r.....	—1.s+1.25c 40° r.....	1.00.....	.25.....	0.75.....	
.75c 85° l.....	—1.75s+.75c 85° l	1.75.....	1.75.....	100.00.....	
+.75c 85° r	—1.75s+ 75c 85° r	1.75.....	1.75.....	100.00.....	
.5c 80° r.....	—2.s—1.5c 80° r.....	3.50.....	3.50.....	100.00.....	
.....	—12.s.....	12.00.....	12.00.....	100.00.....	
.....	—1.2s.....	12.00.....	12.00.....	100.00.....	
5.c 50° r.....	—5.s—.75c 50° r.....	6.25.....	6.25.....	100.00.....	
.....	—5.5s.....	5.50.....	5.50.....	100.00.....	
.....	—.75s.....	.75.....	0.00.....	100.00.....	
.....	—.75s.....	.75.....	0.00.....	100.00.....	
.....	—13.s.....	13.00.....	13.00.....	100.00.....	
.c 75° l.....	—11.s—2.c 75° l	13.00.....	13.00.....	100.00.....	
80° r.....	—1.s+1.5.c 80° r	1.00.....	0.00.....	100.00.....	
0° l	—.5s+1.c. 90 l.....	.50.....	0.00.....	100.00.....	
.5c 50° r.....	—8.s.....	8.00.....	7.00.....	87.50.....	
.....	—.5s.....	.50.....	0.00.....	100.00.....	
.....	—.5s.....	.50.....	0.00.....	100.00.....	
.....	—1.25c 90° r	1.25.....	0.00.....	100.00.....	
° r.....	—1.c 40° r	1.00.....	1.00.....	100.00.....	
60° r+1.c 20° l	—2.5c 60° r+1.c 30° l..	2.50.....	2.50.....	100.00.....	
5° r.....	—.5c 55° r	.50.....	.25.....	.50.....	
0°	—.25c 0°	.25.....	.25.....	100.00.....	
+1.75c 90° r.....	—2.5c 90° r	2.50.....	.25.....	.10.....	
85° l+1.5c 5° r.	—2.25c 85° l.....	2.25.....	.75.....	.33.....	
+1.c 90° r.....	—10.s—1.75c 90° r	11.75.....	11.00.....	.93.....	
+1.c 90° l	—10.s—1.c 90° l.....	11.00.....	11.00.....	100.00.....	
20° r.....	—1.25c 20° r	1.25.....	0.00.....	100.00.....	
.....	—.75s	.75.....	0.00.....	100.00.....	
2.5c 35° r.....	—5.5s—3.c 35° r	8.50.....	7.00.....	.82.....	
2.c 45° l.....	—6.s—1.5c 45° l.....	7.50.....	6.00.....	.80.....	
50° r	—.75s	.75.....	.25.....	.33.....	
25.c 90° l.....	—.50s	.50.....	0.00.....	100.00.....	
-.5.c 85° r....	—.50s—.5c 85° r	1.00.....	0.00.....	100.00.....	
90° r.....	—2.25c 90° r.....	2.25.....	2.25.....	100.00.....	
90° l	—2.25c 90° l.....	2.25.....	2.25.....	100.00.....	
.....	—1.75s+1.c 50 r	1.75.....	.75.....	.42.....	
.....	—1.25+.5c 50° l.....	1.25.....	.75.....	.60.....	
Dioptrics		201.75.....	180.25.....	88.90.....	.=A

Per Cent. of Manifest Myopia	Sum Maximum for Dioptrics of Myopia for each class of five years	Sum Minimum of Dioptrics of Myopia for each class of five years	Class per cent. of Manifest Myopia for each class of five years	REMARKS.
100.00				No disease
100.00				No disease
100.00	43.00	41.50	96.51	Choroiditis
100.00				Choroiditis
100.00				No disease
100.00				Choroiditis
100.00				Choroiditis
0.75				No disease
0.75				No disease
100.00				No disease
100.00	61.00	59.50	96.72	No disease
100.00				Slight corn.scar
100.00				No disease
100.00				No disease
100.00				No disease
100.00				No disease
100.00				No disease
100.00				No disease
100.00				Choroiditis
100.00				Choroiditis
100.00	39.25	33.00	84.07	No disease
100.00				No disease
87.50				Slight neb.con.
100.00				No disease
100.00				No disease
100.00				No disease
100.00				No disease
100.00				No disease
.50				No disease
100.00				No disease
.10				No disease
.33	49.75	40.00	80.40	No disease
.93				Choroiditis
100.00				Choroiditis
100.00				Choroiditis
100.00				Choroiditis
.82				No disease
.80				No disease
.33				No disease
100.00	2.25	0.25	11.11	No disease
100.00				No disease
100.00	4.50	4.50	100.00	No disease
100.00				No disease
.42	3.00	1.50	50.00	No disease
.60				No disease
88.90	.=Average per cent. D. Myopia			

CONCLUSIONS.

1. That the maximum of apparent myopia is greater in those not subjected to mydriatics, as determined by the instrument.

2. That in many cases the *mydriatic* and *non-mydriatic* myopia are equal.

3. That in many cases of simple myopia, the *accommodative* myopia can be determined with the instrument, and hence the *force* of that muscle ascertained through its agency.

4. That hyperopia may mask a large proportion of the myopia, 89.65 per cent., when mydriatics are not employed.

5. That the pressure of disease in the eyes of the patients in these cases did not seriously interfere with the ascertainment of the myopia present.

6. That an instrument capable of detecting, as an average, 88.11 per cent. of myopia without the use of mydriatics, may be regarded as practically adapted to that purpose.

Finally, it should be stated that in the cases of the table each result obtained from the instrument was compared with the vision found by the use of the test-types, and they were alike in each example.

This instrument is manufactured by Messrs. Geo. Tiemann & Co., 67 Chatham street, New York City.

ZANESVILLE, Ohio, March 22, 1884.

EXTIRPATION OF THE LACHRYMAL SAC.

S. C. AYRES, M. D., CINCINNATI.

The successful treatment of tear-sac troubles requires not only time and patience, but good judgment on the part of the operator. The different cases which one meets require a modification of the treatment to suit the various conditions. The stricture may be high up or far down, near the lower end of the nasal duct, or there may be more than one stricture. There may be considerable dilatation of the tear-sac itself with very slight stricture, or there may be denudation of the bony portion of the

canal, or even a firm bony closure. These considerations, and others including the age and physical condition of the patient, have to be taken into account. In addition there are complications, such as a granular condition of the lids, eversion of the puncta, fistula of the tear sack, and accidental and natural deformities in the bony walls of the nasal duct.

The method generally adopted—that of *Bowman*—will be successful in a large proportion of cases.

It requires time, and the treatment may extend over weeks, or even months. But probing alone does not always answer, and occasionally we derive much benefit from the use of *Stilling's* knife in incising the stricture. This measure seems to greatly facilitate matters, and assists in curing cases where the simple introduction of the probes was ineffectual. The injection of astringents into the tear-sac is of undoubted benefit, and probably is not often enough resorted to. There is a disposition to trust to the influence of the probe on the walls of the lachrymal sac and nasal duct, forgetting that astringents are quite as useful there as in combatting a granular condition of the conjunctiva. The lachrymal sac is undoubtedly often lined with granulations, and from long continued blennorrhœa its walls become relaxed and distended. In this condition the passage of the probe is often difficult, for it catches in the folds of the mucous membrane. Under these circumstances one inexperienced in operating may pierce the mucous membrane and make a false passage.

A phlegmon of the sac resulting in a fistulous opening may still more complicate matters. If the fistula closes spontaneously, as it most frequently does, there must necessarily be more or less cicatricial alteration in the walls of the sac. If the fistula remains permanently and has a capillary opening, as is generally the case, it is a difficult matter to obliterate its track, even after the stricture is opened.

Cases are met with where there is only a very soft stricture; and yet when from long continuance of the blennorrhœa there is an enormous dilatation of the tear-sac itself. Here the use of astringent injections is of special advantage.

But where we have a firm stricture of the nasal duct, we have

the greatest difficulties to contend with, and the most unsatisfactory results. Probing is of no avail, and we are therefore limited to a palliative treatment, such as opening the upper canaliculus, pressing the tear-sac out, and treating it by injections.

Various methods of treatment have been devised for the relief of such cases.

Obliteration of the tear-sac has been resorted to by a number of operators, but the results have not been satisfactory, and it is now very seldom, if ever, done. The destruction of the mucous membrane of the sac is accomplished by the use of mineral acids, nitrate of silver, galvano-cautery, actual cautery, butter of antimony, perchloride of iron, etc.

Extirpation of the lachrymal gland has been recommended by very good authority, and its results have been such as to justify a resort to it in extreme cases.

In 1868 *Dr. Berlin* reported some cases to the Ophthalmological Congress at Heidelberg, where he had extirpated the lachrymal sac with excellent results. In this operation he has not had a very extensive following. *Arlt*, in the *Handbuch der Augenheilkunde*, considers the operation very difficult, and in some cases impossible. He states that he had made it a few times, but on account of excessive hemorrhage from the angular artery, had ceased to perform it.

In *Græfe's Archives*, Vol. 27, part 2, is a paper on Extirpation of the Tear-Sac, by *Dr. P. Schreiber*, Assistant in *Græfe's* Eye Infirmary at Halle.

He gives in detail the history of nine cases where he had performed the operation. The results were satisfactory in all, but the hemorrhage was excessive in two or three of them. A strictly antiseptic dressing is applied, and healing by first intention is obtained in most of the cases. His conditions for making this operation are:

1. Very obstinate dakryo-cysto-blennorhœa with stenosis of the nasal duct, which, although it can still be probed, yet is of such long standing, that there is enlargement and thickening of the walls of the tear-sac.

2. In fistula of the lachrymal sac, especially in cases where

there has been a frequent recurrence of abscesses, and where the skin over the sac and the sac walls have become blended.

3. In old catarrh of the sac, even where the canal is pervious, for it leads to the development of polypoid proliferations from its mucous membrane.

In looking at his cases critically, one might with good reason make objection to some of them, especially cases 3 and 5, where extirpation of the tear-sac was performed in blenorrhœa of only six months standing, and where other measures had not been resorted to. And in more of the cases it seems probable from the histories that other and well known methods of treatment had not been exhausted, before resorting to the somewhat formidable operation of extirpating the sac itself.

The following case is reported as being one particularly suited for extirpation of the tear-sac as other measures had failed to give relief:

Mrs. L., age 32, a healthy, well developed person, had suffered from blennorrhœa of the left tear-sac for fifteen years. The epiphora had been very annoying, and the tear-sac filled every day, but she was in the habit of pressing it out. This gave her only temporary relief, and of late years she had suffered more than usual. She had great difficulty in emptying the sack. The skin over it was in very good condition, and was not adherent or scarred. The distended tear-sac could be plainly seen and felt, but the firmest pressure did not entirely empty its contents. When she turned the eye far upwards the sac seemed to extend downward below the margin of the orbit, and could be felt with the finger. It felt like a diverticulum from the sac, which extended downward, but which in an ordinary examination would have escaped observation. It was only from strong rotation of the eye upward that the outlines of the tumor could be felt. It was decided to attempt to pass a probe, and the ordinary operation was performed after slitting the upper canaliculus. With great difficulty a medium sized probe was passed through the bony stricture. It did not result in any amelioration of her symptoms, except that she was able more easily to evacuate the contents of the sac. With all the pressure she applied (and it was remarkable how much force she exerted when she herself tried

to empty the sac), she was aware that still more remained. Extirpation of the lachrymal sac was recommended as a last resort, and she readily consented. The operation was made under full anæsthesia in the manner recommended by *Dr. Schreiber.* The incision through the skin was fully one inch in length. Its direction was a little outward from the nose, so as to be over the dilated sac. The skin was easily separated from the sac, and the latter was exposed in its entire length before cutting into it. Its walls were very much hypertrophied, and the bottom of this enlarged sac, or more properly diverticulum, was filled with thick pus. The sac walls could, by their color, be very readily distinguished from the other tissues, and were entirely removed by the aid of scissors. The extirpation was as thorough as it could be made, and the sac from its upper extremity down to the nasal duct was cut away. The peculiar dilatation of the sac in this case was probably caused by daily vigorous pressure upon it for many years. There was but little hemorrhage during the operation, and the wound was closed with six sutures. Iced compresses were applied, and the skin healed by first intention. About a week later there was a small opening in the skin, just opposite the caruncle. I pressed a drop of pus out, and then dipped an ordinary dressing probe in pure carbolic acid, and pushed it down until it touched the lachrymal bone. This cauterization served to arrest the suppuration, and in a few days the incision healed over smoothly. I saw her a few months later, and the scar was very slight; indeed hardly noticeable. The relief was all that could be expected.

The diverticulum was pouch-shaped, and measured half an inch in length. Ordinarily it rested behind the rim of the orbit, but when the sac was distended, could be felt when the eye was rotated upward.

In bony stenosis of the nasal duct this operation may be resorted to with reasonable hope of a satisfactory result. It is less formidable than removal of the lachrymal gland, and is more certain of success and less liable to leave an unsightly scar than the use of caustics.

ON THE PROPHYLAXIS AND TREATMENT OF PURULENT CONJUNCTIVITIS OF THE NEWLY BORN.

BY HENRY SCHWARZ, M. D., ST. LOUIS, LATE ASSISTANT PHYSICIAN TO THE UNIVERSITY FEMALE HOSPITAL OF HEIDELBERG.

The more our knowledge of the origin and nature of a disease advances, the better we are enabled to prevent or to cure it. The truth of this sentence becomes most obvious when we call to our mind the reduction which has taken place within the last few years in the frequency of purulent conjunctivitis of the newly born.

We know that this disease is always due to an infection of the conjunctiva by pus, leucorrhœal, lochial or gonnorrhœal discharges. The malignancy of the case varies with the nature of the infecting material ; but even a mild case may through lack of proper treatment become malignant, and therefore calls for the utmost attention from the very beginning. As a rule, the most virulent forms are caused by gonnorrhœal discharges. In these cases rather large roundish micrococci are always found in the discharge ; they are easily seen when stained with basic aniline colors. They form characteristic small conglomerations with comparatively large interspaces between the single cocci ; frequently they are found lying upon the pus cells. They are therefore to all appearances identical with the micrococci constantly found in gonorrhœa and first described by *Neisser* in 1879, and with those recently discovered by *Robert Koch* in Ægyptian Ophthalmia[1].

How these micro-organisms act, further developments must show. The knowledge that in anthrax, erysipelas, chicken-cholera, septicæmia in mice, glanders and some other zymotic diseases, the micro-organisms are the exciting cause of the disorders, renders it probable that the cocci constantly found in purulent

1. In the second report of the German Cholera-Commission, dated Suez, Nov. 10, 1883, KOCH states that he investigated nearly 50 cases of Ægyptian eye-disease, and that in the malignant forms thereof he always found a micro-organism to all appearances identical with the micrococcus of the gonorrhœa.

conjunctivitis and in gonorrhœa are also the real cause of these diseases. But in order to prove this conclusively, it is necessary to cultivate these micrococci on serum-gelatine or some other suitable substratum, observing thereby all the stringent precautions necessary to insure complete isolation. If with the microscope we still find the characteristic cocci, described above, in the 5th, 6th or any succeding generation of micro-organisms thus cultivated, we may prove their pathogenic nature by proper inoculations. Should we be able to produce the specific disease and to find in its secretions the specific micrococci, then and then only would we have proved, beyond a doubt, that the disease in question is caused by these organisms, and it would only remain to show that the coccus of purulent conjunctivitis and that of gonorrhœa are identical. If this is the case, cocci isolated by culture from purulent conjunctivitis should by proper inoculation produce gonorrhœa, and those isolated from gonorrhœal secretions must produce purulent conjunctivitis.

This isolation of the cocci by cultivating them on serum-gelatine has been accomplished in both cases, but the result of the inoculations have not yet been conclusive. The animals experimented upon were not susceptible to the diseases in question and the results have thus far been negative. As far as I know, no experiments have been made on monkeys, and it is to be hoped that these animals, as on a former occasion[1], will prove as good subjects for innculation as man himself.

Inoculations with the isolated micrococci of gonorrhœa have been made on man and proved successful in every instance; but the number of experiments is too small, and their results have not yet been corroborated by other observers. For this reason they cannot at present be accepted as conclusive evidence[2].

1. In febris recurrens the inoculation with a patient's blood fails to develop the disease in any animal except the monkey. In 1879 while connected with the hospital for relapsing typhus at Giessen, where a large epidemic prevailed, I had occasion to satisfy myself of the fruitlessness of inoculations on mice, bats, guinea-pigs, rabbits, cats, dogs, sheep and horses, while inoculations made elsewhere on monkeys were successful. The animals showed all the symptoms of the disease and their blood contained the characteristic spirilli.

2. These experiments were made by *Bockhardt*. who inoculated a patient suffering with a fatal cerebral trouble, the result being the development of a typical gonorrhœa three days afterwards. B. repeated the experiment successfully on a number of medical students who volunteered for the occasion.

In the majority of cases the eyes of the newly born are infected during parturition, and more particularly during the passage of the child's head through the maternal vagina. After the rupture of the membranes the head usually descends into the vagina, the os uteri at the same time retracts so that at a certain stage of advanced labor it encircles the child's neck. The eyes of the fœtus, although they are closed, will therefore come in intimate contact with the walls of the vagina and may be infected, if leucorrhœa or gonorrhœa exists. The danger is, of course, greatly augmented if the latter stage of parturition is protracted, or if the child opens the eyes before the head is born, as it may do in cases of asphyxia. All cases of blennorrhœa neonatorum developing within five days after birth are probably due to this mode of infection, while all cases developing at a later period are due to infection post partum.

In regard to the frequency of the disease it may be stated that only a few years ago the percentage of cases of purulent conjunctivitis was much greater in lying-in hospitals than in private practice. In hospital practice at present the disease has been so much suppressed by the general adoption of prophylactic measures, that a marked difference in frequency between hospital and private practice no longer exists. While, however, in a well conducted institution the disease is cured without hardly ever permanently impairing vision, outside of the hospitals a great number of eyes are annually lost for want of rational treatment. In fact most cases of so-called congenital blindness are not really congenital but are due to purulent conjunctivitis.

Our measures against the disease should be taken in two directions:

We should (1) by prophylactic means try to prevent it, and if this fails, we should (2) try to limit it to the affected eye and institute at once careful and well directed treatment.

Prophylactic measures have been employed at all times, but they have until a few years ago been anything but satisfactory. In most of the lying-in-hospitals of Germany, even after the general adoption of antiseptic vaginal irrigations during labor, there have been about 12 per cent of purulent conjunctivitis.

Credé in 1874 had among 323 deliveries 45 cases, or 13.6 per

cent of this affection, and in 1879 still over 9 per cent. From the first of June, 1880, he adopted the following measure in every case, and it must be admitted he met with the most brilliant success. With the aid of a glass-rod one drop of a 2 per cent solution of nitrate of silver (about 10 grs. to ℥i.) was dropped into the eye of the newly born soon after birth. *Credé* states that it is not necessary to evert the lids, as a contact of this solution with the cornea usually causes no irritation. The eyes are, however, cooled for the next 24 hours with linen rags dipped in a 2 per cent solution of salicylic acid. Among the cases thus treated purulent conjunctivitis occurred to the following extent:

1880,	among 211	children	- - -	once.
1881,	" 400	"	- - -	once.
1882,	" 418	"	- - -	twice.

Credé considers all other measures for the prevention of the disease, and especially the vaginal irrigations before and after labor, not exactly useless, but by far not as certain as his own method, because the antiseptic agents cannot be used strong enough[1].

In the lying-in-hospital at Giessen *Kehrer* used prophylactic instillations of a 1 per cent solution of nitrate of silver from 1878 to 1880, at the same time employing frequent vaginal irrigations with 2 per cent solutions of carbolic acid. Still there were from 10 to 12 per cent of purulent conjunctivitis. After *Credé* had published his results *Kehrer* directed me to try the 2 per cent solution of nitrate of silver; but in my hands this method did not prove as harmless as it did at Leipzig, for although I always everted the lids to prevent the solution from coming in contact with the cornea, the instillations were followed by marked irritation and watery secretion, and were therefore soon abandoned. It would appear that in our case the babies could bear a 2 per cent solution of nitrate of silver no better than adults. In 1881 *Kehrer* took charge ot the female hospital at Heidelberg, and there gradually developed a prophylactic measure, which to us proved very satisfactory, especially, after he had introduced corrosive sublimate in April, 1882, for almost all pur-

1. Arch. f. Gynæcology, XVII. Bd. Hft. I u. XXI. Bd. p. 2.

poses for which in the lying-in department we had formerly used carbolic acid. The frequency of purulent conjunctivitis was now reduced to from 3 to 4 per cent (and at the same time grave puerperal affections became almost unknown). The mode of treatment was the following:

Vaginal irrigations were still resorted to, but 2 per mille solutions of corrosive sublimate were used for that purpose. *Kehrer*, however, considered these irrigations not thorough enough, and ordered that in every case of labor the walls of the vagina and the outer surface of the portio vaginalis should be thoroughly disinfected by wiping them with cotton-balls saturated with a 2 per mille solution of corrosive sublimate in glycerine. In order to insure still greater safety, the eyes of the child were irrigated with a 1 per cent solution of carbolic acid. As *Kehrer* usually places the woman on the side when the expulsion of the child commences, we were in most cases enabled to make these irrigations before the eyes had been opened. Between the expulsion of the head and that of the shoulders there is commonly a marked pause, which usually sufficed for our purpose. In these irrigations the stream should at first be directed against the child's closed eyes to carry off all adherent matter. Then the lids are carefully everted by an assistant, so as to bring to view and to make accessible to irrigation the fornix of the conjuntiva.

These means are very efficient and are decidedly called for in hospital practice, but they are too tedious and to a degree too annoying to make their general adoption desirable in private practice. Here it will generally suffice to cleanse the child's eyes soon after birth with plenty of pure water, which in itself is a very good disinfecting agent. Only in cases of vaginal blennorrhea or in protracted labor we would have to adopt a more energetic course. We should then not only employ antiseptic vaginal irrigations, but also cleanse the vagina with cotton-balls saturated with a strong antiseptic solution. In such cases it would also be necessary to resort to the prophylactic instillations of nitrate of silver, or, what I should prefer, the irrigation of the child's eyes with plenty of pure water to which a little carbolic acid or some other antiseptic agent can be added.

We have thus far only alluded to the means for preventing or rendering harmless an infection at the time of parturition. It now remains to consider the ways for preventing an infection at a later period. At this time the infection may be caused by the lochial secretions or the secretions from the umbilical cord, and the only, but certain, means to prevent this infection is the utmost cleanliness. If the same woman who attends to the mother, washes and dresses the child, she should never touch the child immediately after her hands have come in contact with the genital organs of the mother, or with any sheets, etc., that have been sullied with lochial secretions. She should always wash and dress the child before attending to the mother. A separate sponge and basin should be used for the child's face and a larger basin or a tub for the body, so that no water containing matter formed by the sloughing off of the umbilical cord can possible reach the child's eyes. If these rules are strictly observed an infection of the baby's eyes after delivery is next to impossible.

When one eye only has become infected it is not an easy matter to keep the other eye free from the disease, and with all precautions we often fail in the attempt. It has been recommended to make use of a protective dressing over the healthy eye, but I have seen little good from such proceeding. It is more advisable not to use any such dressing, but to place the child always on the side of the diseased eye. The cushions should be protected by a piece of oil-cloth over which a piece of linen is spread. If the secretions are, moreover, frequently removed from the inflamed eye, we may hope in this way to limit the disease without losing control over the second eye.

In regard to the treatment of purulent conjunctivitis, I shall only speak of the method employed at the female hospital at Heidelberg. It consists mainly in cauterizations with solutions of nitrate of silver, and in removing the secretions almost as soon as they form, and cold applications. These are best made by placing a number of small linen rags, about two inches in diameter, on a large chunck of ice, and then over the lids. They should not be allowed to get warm, and must therefore be changed at least every two minutes. The cauterizations should not be

made oftener than once in twenty-four hours, and on no account should they be repeated before the epithelium, destroyed by the last application, has been restored. A solution of 1 per cent. is generally sufficient, but if the secretion is very profuse it may be necessary to use a two per. cent. solution. Care must always be taken that the fornix of the conjunctiva is well reached by the cauterization. After each application the eyes should be cooled in the manner described above or with cold water. In order to remove the secretions quickly the eyes should be irrigated every half hour, or more or less frequently, according to the quantity of the discharge. For the irrigations the child is laid on the lap with the diseased eye downwards, the head is fixed by placing one hand on the top of it and the other over the face, the lids are everted with the two index fingers, and a gentle stream of cool water is applied until all matter is carried off. If the fellow-eye must be irrigated too, the position of the child must be changed so as to bring that eye downwards. This treatment is continued until the conjunctiva has regained its normal condition. The cauterizations may be stopped sooner, and mild cases will in fact get well by the use of the irrigations alone.

This treatment prevented permanent impairment of vision in all cases which originated in the hospital, and it was only in policlinic practice that I had a chance of seeing grave complications of the cornea or even perforation of that membrane and prolapse of the iris; every one of them was due to indifference on the part of the relatives or to the prolonged use of home remedies. These cases were invariably directed to the ophthalmological clinic.

A CASE OF SYMPATHETIC NEURO-RETINITIS. — REMARKS ON SYMPATHETIC OPHTHALMIA.

BY ADOLF ALT, M. D.

I. Gr., æt. 28, came under my treatment on Aug. 28, 1879. His mother stated that he never saw with his left eye. Soon after his birth she had observed that a gray spot was lying behind that pupil, and the family physician had declared it to be a

cataract. When the patient was 8 or 10 years of age, he was operated upon this eye in England, but without apparent success. According to his statement the operator had attempted to make an artificial pupil. A second operation, performed somewhat later on, seems to have been an unsuccessful attempt to extract the cataract. The right eye has always been short-sighted.

The dimness in the lens is said to have gradually spread. A year ago, while the patient was earning his bread as rider in a circus, he observed that the cataract had fallen into the anterior chamber. Without any interference, and without having caused any trouble, the cataract, however, had slipped back again after a few days. About 2 months ago this left eye became considerably inflamed, and at the same time the cataract without any known cause, had again fallen into the anterior chamber, and had since then remained there.

On account of the severe pains in the left eye, and a well pronounced weakness of the right eye he consulted a physician who advised him to have the left eye removed.

When I saw him first the condition was the following: L. E. Moderate hyperæmia of the conjunctival and ciliary blood-vessels. The periphery of the cornea slightly dim and pannous. Near the corneo-scleral margin upwards a very fine linear scar about 7 millm. long is visible: Behind this corneal scar lies a broad artificial coloboma of the iris. The region of the normal pupil is covered by the somewhat shrunken and cataractous lens, which is dislocated downwards and outwards into the anterior chamber and held there firmly as if it had become adherent. V=o; Tn. The ciliary region is very painful on pressure. R. E. Some photophobia. Hyperæmia of the conjunctiva. Slight lachrymation. Fundus perfectly visible and apparently normal. With −16 V=$\frac{20}{20}$. Tn. F. normal.

I proceded to enucleate the left eye on the same day. The wound healed without trouble.

On the evening of the same day and but a few hours after the enucleation of the left eye, the right eye began to be painful to such a degree that the patient, who evidently was not effemminate, spoke of it as unbearable. This pain came on in attacks

during the following three days with free intervals. When I saw the patient on the fourth day, not having been notified of his condition previously, I found the iris slightly discolored and acting slowly. After having succeded in dilating the pupil ad maximum, which was comparatively difficult, I found the retinal veins very full and broad.

During the following week the pain disappeared altogether, yet sight grew continually worse, until it was reduced to $\frac{10}{200}$, and about six days after the enucleation the eye showed a well marked neuro-retinitis. The papilla was considerably swollen and its outlines were very indistinct. Veins and arteries were covered by a whitish exudation for quite a distance from their origin, and where the veins were visible they were very full and tortuous. White patches were found also in the periphery of the retina, and near the papilla upwards a striated hemorrhage was visible lying close to a large arterial branch.

The urine was perfectly normal. There was no constitutional disease and no affection of the heart or brain, to which the neuro-retinitis might have been referred. The stump of the optic nerve of the enucleated eye could not be felt, and was, therefore, not in a condition of mechanical irritation.

From the foregoing the case must, I think, be considered one of sympathetic neuro-retinitis.

The patient was kept in a dark room and his pupil under the influence of atropia, and corrosive sublimate (gr. $\frac{1}{10}$ three times a day) was given internally. The infiltration of the retina disappeared gradually under this treatment, the hemorrhage became absorbed, and the optic papilla resumed its normal level. When after four weeks more the patient was discharged, some venous hyperæmia was yet noticeable. Vision was again $\frac{20}{40}$ with –16, the optic papilla did not appear whitish, as I have observed it in several other cases of sympathetic neuro-retinitis.

The enucleated eye-ball was hardened in Mueller's fluid and afterwards in ordinary alcohol.

Aside from the clinical interest attached to this case, the pathological changes in the eye-ball were important enough to be here reported.

I first searched for the scar in the cornea resulting from the

iridectomy, but to my great astonishment I was hardly able to locate it in the microscopical sections, although it had been very easily visible during life. But for an irregularity in the epithelial layers and a few very minute blood-vessels, I could not have found it under the microscope. Neither *Bowman's* layer nor *Descemet's* membrane seemed ever to have been cut. Although I have never before seen such a perfect union after a section which penetrated the whole thickness of the cornea, this case seems to prove that a direct reunion of the wound-lips of *Bowman's* layer as well as of *Descemet's* membrane is possible.

At the height of the artificial pupil the iris tissue was totally wanting and the fibres of the ligamentum pectinatum merged directly into the tissue of the ciliary body. The ciliary processes here were drawn forwards to a coniderable degree, even farther than where the insertion of the iris should have been. Near the limbs of the coloboma a small, club-shaped stump of iris-tissue was found. This stump was covered on its anterior and posterior surface with darkly pigmented cells (meridional sections). The tissue of the limbs of the coloboma appeared hyperæmic and was filled with lymphoid cells.

Fig. 3.

Another point of interest was the part of the angle of the iris, where during life the cataractous lens had appeared adherent. That it had not really been adherent, was shown by the fact that it had fallen out of this position during the hardening of the specimen.

In microscopical sections I found this portion of the angle of the iris to be obliterated by a newly formed tissue, which appeared very similar to the corneal tissue. (See figure 3). This newly formed tissue was arranged in lamellæ, contained a small number of cellular elements, but no blood-vessels. It was, however, lined by a hyaline membrane anteriorly as well as posteriorly (in meridional sections), which was of about half the thick-

ness of *Descemet's* membrane. This tissue became gradually thinner towards the center of the cornea, and ended about 4 millms. from the corneo-scleral margin. Here the two hyaline membranes coalesced into one thicker membrane, and the endothelium of this membrane could be traced backwards for a small distance upon the hyaline membrane which lined the posterior surface of the newly formed tissue. (See figure 3).

[TO BE CONTINUED.]

CORRESPONDENCE.

The following is a communication from Dr. David Coggin, Salem, Mass. We think its subject is one of great importance :

WANTED—AN OPHTHALMIC NOSOLOGY.

The Provisional Nomenclature of Diseases of the Royal College of Physicians of London, adopted over sixteen years ago, and which is used here to some extent, contains a list of less than ninety diseases and injuries of the eye; that it is obviously inadequate to meet the demands of ophthalmologists is shown by the fact that annual reports of eye hospitals in this country ordinarily contain lists of about two hundred titles.

A uniform nomenclature of the eye diseases of to-day, alphabetically arranged and classified, would not only be of great assistance in indexing cases, both in private and in hospital practice,and in assuring that degree of orthographical correctness which now is sometimes lacking in hospital reports, but tautology would be avoided while a concise uniformity would be attained.

There lies on the writer's desk the last report of one of the largest and oldest institutions in the country. In it "*posterior staphyloma*" and "*sclerotico-choroiditis, posterior*" are classed under the same head as distinct affections, and so, too, are "*opacities of the cornea*" and "*leucoma.*"

Blepharitis, blepharitis marginalis, and "*blepharadenitis*," in divers reports, all doubtless refer to the same disease, and the same is true of "*ulcer of the cornea*" and "*ulcerative keratitis.*"

"*Fistula of the lachrymal sac*" in one report appears in others as "*lachrymal fistula*," (though probably not a fistula of the gland is referred to.)

"*Amblyopia ex abusu*" is variously classed under the heads of "*Refraction*," "*Optic Nerve and Retina*," and "*Affections of the Percipient Apparatus*," while *Muscæ Volitantes*" is found quite appropriately in many different places.

En passant, it is to be deplored that, despite all that has been said of late upon the subject, cataract extractions still receive so little notice in the yearly reports of eye infirmaries. If the reverse were true, the pamphlets which, as a rule, are glanced hastily over before being consigned to the waste-paper basket, would have real statistical and practical value.

Allowing that it would be well nigh impossible to devise a terminology that would meet all the requirements that might be demanded of it, would it not be feasible to adopt a system that would at least be preferable to the existing non-conforming ones?

CORRIGENDA.—NO. 1.

Page 3, 6th line from above read iridectomy instead of iridoctoctomy.

Page 13, 8th line from below read myopia instead of myopic.

Page 17, 11th line from above read *presence* instead of *pressure.*

In the table of Dr. Culbertson in case 7, column 6, change 75° into 65°.

In case 11, column 6, change 75c into .75c.

In case 12, column 5, change .2s into 2.s.

In case 14, column 6, change 1.2s into 12.s.

In case 15, column 5, change 76.c into .76c.

In case 27, column 5, change .1c into 1.c.

In case 28, column 5, change 20° into 30°.

In case 40, column 5, change 25.c into .25c.

The addition of the sums in column 7, ought to read 202.75 instead of 201.75.